

Richard O. Cunningham  
202.429.6434

**Public Version**

**CONFIDENTIAL BUSINESS INFORMATION  
DELETED FROM SINGLE BRACKETS [] AT PAGES 1, 2, 3, 9 AND EXHIBIT 2  
AND INDEXED AT PAGES 1, 2 AND 9**

November 13, 2001

Via E-mail

Ms. Gloria Blue  
Executive Secretary, TPSC  
Office of the USTR  
600 17<sup>th</sup> Street, NW.  
Washington, DC 200508

Re: Steel: Exclusion Request for Special Profiles

Dear Ms. Blue:

Pursuant to the Notice published in the Federal Register on October 26, 2001, Corus Group plc ("Corus") hereby requests that special profiles be excluded from any increased duty, tariff-rate quota, or quantitative restriction that the President may impose under section 203(a) of the Trade Act of 1974. Specific examples of the special profiles for which Corus requests exclusions are grouser bars, rippershanks, forklift masts, bulb flats, wheel rims, bevel flats, and general engineering profiles. These are specialized products that either are not made domestically or are not made in sufficient quantities to satisfy demand.

Corus' business confidential information relating to its commercial and financial data has been deleted or indexed. The data deleted or indexed provide detailed information about Corus' commercial shipments and market expectations. Moreover, some of the deleted or indexed

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information pertains to shipment volumes and values of ProfilARBED, a foreign producer and importer of certain special profiles, which Corus has used with the permission of Counsel for ProfilARBED in these proceedings.

If you have any questions or concerns, please do not hesitate to contact the undersigned.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Richard O. Cunningham", written over a circular stamp.

Richard O. Cunningham

Tina Potuto Kimble

Carlyne S. Cockrum

Counsel for Corus Group plc

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## EXECUTIVE SUMMARY

Special profiles are non-commodity, highly engineered, custom-made steel products that account for a small portion of all imports of hot-rolled bar and light shapes,<sup>1</sup> and for which there is no adequate domestic source of supply. As a category of product, special profiles contains hundreds of custom designed and uniquely specialized shapes used in the manufacturing of earthmoving equipment (bulldozers), automotive parts (car door hinges), industrial handling equipment (forklifts), commercial vehicles (wheel rims) and numerous other specialized applications. The manufacturing process required for production of these articles involves special machinery and expertise. As a result, a very limited number of producers located within the United States and abroad are capable of meeting those production requirements. These products are manufactured for a particular end-use and there are no substitutes available in the market. Finally, these products are extremely high-value products, with prices in the market that are substantially above those for the commodity grades with which they are joined in this investigation. Consequently, Corus respectfully requests that these special profiles be excluded from any relief provided to domestic producers of steel products.

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<sup>1</sup> Rippershanks are the only special profile classified in this 201 investigation as something other than a hot-rolled bar and light shape. Rippershanks fall within the plate category, as defined by the International Trade Commission.

## EXCLUSION REQUEST FOR SPECIAL PROFILES

**a. The Commercial Name for the Product and HTS Numbers Under Which the Product Enters the United States**

Product	HTS Numbers
Grouser Bars	[ ]
Rippershanks	[ ]
Forklift Masts	[ ]
Bulb Flats	[ ]
Rims	[ ]
Bevel Flats	[ ]
Others	[ ]

Many of the special profiles are classified under basket category HTS numbers.

Consequently, to help the TPSC in its assessment, Corus also provides below the volume and value of its imports for each year from 1996 through 2001.

### Corus Special Profiles – Shipments to the United States

Short Tons						Jan-Jun	Jan-Jun	US \$ per short ton *			
Product	1996	1997	1998	1999	2000	2000	2001	1998	1999	2000	2001
Grouser Bars	[100	150	165.3	86	98.7	58.3	47.1	100	95.3	84.2	82.6]
Rippershanks	[100	130	110	100	100	50	50	100	100	100	100]
Forklift Masts	[100	94.4	106.5	84.6	87.3	45.4	44.7	100	82	97.3	93]
Bulb Flats	[100	266.6	349	107.6	19.5	11.5	144.4	100	95.2	92.4	93]
Rims	[100	775	445.9	92.3	361.1	183.4	186.2	100	110.9	111.3	106.8]
Bevel Flats	[100	100	109.4	89.3	63.3	37.3	17.8	100	91.6	88.9	86.9]
Others	[100	268.8	145.3	112.3	136.7	71.6	30.5	100	93.8	87	92.7]
<b>Total</b>	<b>[100</b>	<b>161.3</b>	<b>155.1</b>	<b>89.9</b>	<b>98.3</b>	<b>54.9</b>	<b>47.7</b>	<b>100</b>	<b>94.7</b>	<b>94.5</b>	<b>88.9]</b>

\* Corus does not have records of its sales price in the U.S. market that are easily obtainable. These sales figures were calculated by adding freight costs to prices from the mills in the UK.

Additionally, Corus is providing the TPSC with information from ProfilARBED, a second foreign producer of special profiles. This import data for their shipments to the United States of track shoes (grouser bars) and carbuilding sections is taken from their exclusion request filed with the International Trade Commission. Carbuilding sections are imported under HTS number [ ]. Carbuilding sections are made to American Rail Car Institute specifications.

**Arbed Special Profiles – Shipments to the United States**

Short Tons						Jan-Jun	Jan-Jun
Product	1996	1997	1998	1999	2000	2000	2001
Grouser Bars				100	100	100	100]
Carbuilding	[100	144.4	300	177.7	88.9	44.4	22.2]

\*Information not available

**b. Description of the Products Based on Their Physical Characteristics**

Special profiles generally can be defined as non-commodity, custom-made hot-rolled bar and light shapes, characterized by their asymmetrical shape. Special profiles include the following shapes, each destined to a very limited and specific end-use:

- Grouser Bars are very unique and specialized hot-rolled shapes used by manufacturers of earthmoving equipment. They are specially designed and used as "track shoes" for bulldozers, hydraulic excavators, and tracked loaders. Grouser bars have a curvilinear flat base shape with either a single, double or triple spike. Size of grouser bars range from widths of 7" to 15" , and lengths of 261" to 384". Produced in a long bar form at Corus' mills, grouser bars must have properties which enable them to be easily and cost effectively processed into a finished track shoe. The finished part will be exposed to high abrasive wear and impact loading, and must have the required mechanical strength to resist deformation. Thus, grouser bars are specifically designed and engineered to meet the specific needs of earthmoving industry clients. There is no domestic production of grouser bars for use as track shoes.

Rippershanks are a specialized hot-rolled universal flat shape used in the production of heavy-duty earthmoving equipment. A rippershank is the main component in supporting the ripping or tearing action of a bulldozer. This profile is specially rolled on a Corus shapes' mill to achieve the very exacting requirements of an earth engaging component within an earthmoving piece of

equipment. The product is manufactured to very specific steel reduction ratios and chemical properties so as to achieve the needed physical performance characteristics as well as special surface and edge conditioning. Sizes of rippershanks range from 3" - 4.33" in thickness, 13" - 18" in width, and 131" - 278" in length. [

]. Corus' mill has had many years of testing and practice to perfect the rolling process and specification. Rippershanks are not manufactured in the United States and Corus is the only foreign producer known to import this product into the United States.

- Forklift Masts are a specific series of hot-rolled shapes used by the forklift truck manufacturing industry. They are utilized as key components within a forklift truck's lifting-mast structure. These special profiles are most often rolled in the shape of a "J", "C" or "I," with offsets of each to the very exacting and specific tolerances required by the fork lift truck industry. They are sold in a wide variety of specifications.<sup>1</sup> Key features of this precision product include: special straightness to ensure the correct telescoping action of a lifter's mast and special inside angles of the profile to ensure the proper fit of rollers and smooth operation within the assembly. Corus' sales in the U.S. complement domestic production by providing a broader product range and unmatched quality aspects for use in the most demanding forklift truck applications.<sup>2</sup> Steel of West Virginia is the sole U.S. producer of this product.
- Bulb Flats are highly engineered flat-bulb hot-rolled shapes used by the shipbuilding industry. They are specifically designed and utilized to stiffen the plate structure of a ship

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<sup>1</sup> See Corus' product brochure, attached as Exhibit 1.

and provide superior performance features that are of key importance to shipbuilders. Bulb flats are hot rolled, flat, and rectangular shape with both edges on one side tapered, and on the opposite edges, one end has a bulb shape on the top side and a squared edge on the bottom side. Size ranges include widths of 3" - 17", thicknesses of 0.20" - .80", lengths of 236" - 709" (dependant on width). In particular, bulb flats offer improved paintability characteristics for enhancing both corrosion protection and ongoing maintenance and servicing of a ship hold. Corrosion protection and the associated effects on the life cycle cost of a ship are significant issues to modern shipbuilders. Shipbuilding is a global market and, as such, Corus supplies its bulb flats to shipyards around the world. There are no known U.S. producers of bulb flats.<sup>3</sup> Only one other importer, Fundia of Norway, supplies this product to the United States.

- Wheel Rims are a very specialized hot-rolled flanged bar shapes used to manufacture wheels for commercial and off-highway motor vehicles. The profile's geometry, chemical composition and strength characteristics have been developed over 70 years and need to meet continuously evolving performance standards for a particular wheel line. Wheel Rims can be comprised of either 2 or 3 pieces. These components are: a Side Ring, a Locking Ring, and a Base Section. If a two piece assembly is produced, the side ring is not used. All of these sections are comprised of curvilinear shapes that may have grooves, notches, knurling, and profiled ridges that, when conformed from a long bar to the finished product, result in a product that is concave in nature (as seen in most heavy duty trucks) . Corus supplies its

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<sup>2</sup> See Exhibit 2, Corus customer affidavit.

<sup>3</sup> See Exhibit 2, Corus customer affidavit.



specific U.S. clients with unmatched quality and product range and therefore adequately complements the U.S. domestic supply provided by Gautier Steel Ltd. and McDonald Steel.

- Bevel Flats are special hot-rolled flat shapes with various edge bevel configurations used by manufacturers of earthmoving and similar heavy-duty equipment. Bevel flats are typically used as cutting edge components in equipment such as bulldozers, excavators, scrapers, and motor graders. Corus' sales complement the U.S. domestic production of Pennsylvania Steel Technologies, a subsidiary of Bethlehem Steel, by supplying a wider range than is available domestically as well as fulfilling volume requirements that can not be met by domestic suppliers. The only other foreign producer of this product is Manitoba Rolling Mills ("MRM").
- General Engineering Profiles are a large range of specialized hot-rolled shapes used in a wide variety of industries. These profiles are used in applications such as bridge expansion joints, joiners for concrete pipes, grader and carriage components in earthmoving and other handling equipment. Corus is the world leader in the development and manufacture of customized special profiles and offers a wide variety of unique shapes that are not produced in the United States. Corus therefore complements and plays a leading role in the development of special profile usage around the world, including in the United States.

**c. Basis for Requesting Exclusion**

Special profiles in general, and the shapes delineated above in particular, should be excluded from any remedy because they serve niche markets that are not adequately served by the domestic industry. For many of these special profiles, there is either no domestic production or the existing domestic production facilities are not capable of supplying the demand. The inability of the U.S. domestic producers to serve this niche market adequately is totally unrelated

to the import penetration levels. Rather, many domestic producers choose not to manufacture special profiles, and those few domestic producers that do manufacture them focus their financial and human resources on certain limited profiles within a small spectrum.<sup>4</sup>

There are essentially four reasons that special profiles are treated this way by steel producers both in the U.S. and abroad. First, the type of expertise and engineering service involved constitutes a high barrier to entry to many steel producers, including those operating in third countries. Indeed, the research and development costs are not only extremely high but are also sunk if the company does not have the specific tooling infrastructure necessary to manufacture the product. Second, customers are very demanding in terms of quality. The profiles that they order must reach reliability and consistency standards that very few steel producers are capable of achieving. Third, once a steel producer is capable of producing a certain shape, it has to secure certification with potential customers. The certification process is long, costly and financially risky. By way of example, at the International Trade Commission's hearing during the injury phase of the Section 201 investigation on September 24, 2001, a representative for Caterpillar, Mr. Lane, testified that, for over 10 years, Caterpillar had no other choice but to obtain special profiles from producers in the United Kingdom. Despite efforts by Caterpillar to develop a domestic source, the quality offered by potential domestic suppliers was "one-sixth of what {Caterpillar} could get from the U.K."<sup>5</sup> Finally, in order to achieve economies of scale for these low volume, high value products, a producer generally must be willing and able to supply these products on a global basis.<sup>6</sup>

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<sup>4</sup> See Testimony of Mr. Sachdev, ITC Hearing Transcript at 693-94 (Nov. 8, 2001).

<sup>5</sup> Testimony of Mr. Lane, ITC Hearing Transcript at 1480 (Sept. 24, 2001).

<sup>6</sup> Testimony of Mr. Hoyer, ITC Hearing Transcript at 694 (Nov. 8, 2001).

Given these constraints, steel producers of special profiles will only make an investment decision to produce a specific shape if they can mitigate the risks associated with entry. One way to resolve this problem is through cooperation, coordination and exchange of expertise and business information between the steel producer and the customer of special profiles.<sup>7</sup> Obviously, such a level of communication requires long-term supply contracts. Therefore, it is very unlikely that an increase in demand from a customer for a specific shape will cause imports of that shape to rise. Customers simply do not change their source of supply because of erratic or short-term increases in demand. Instead, they increase their orders with the same supplier. Consequently, to the extent that any increase in imports of special profiles occurs from a foreign source, it is likely that these imports do not take away business from U.S. domestic producers.

Finally, the above data show that special profiles are sold at a much higher price than commodity products. Taking the product grade<sup>8</sup> selected by the Commission in the 201 investigation as a benchmark, Corus' special profiles are sold at a premium ranging between \$200 and \$300 per short ton.<sup>9</sup> Clearly, those profiles, accounting for a very small share of total imports of hot-rolled bar and light shapes, sold at such a high price cannot and could not have had any injurious effect.

In sum, because most Corus' special profiles are not produced domestically, Corus competes with domestic producers in only rare occasions. More importantly, should import restrictions apply to Corus' special profiles, there is virtually no domestic producer that could fill

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<sup>7</sup> Testimony of Mr. Hoyer, ITC Hearing Transcript at 608 (Nov. 8, 2001); Testimony of Mr. Sachdev, ITC Hearing Transcript at 692 (Nov. 8, 2001).

<sup>8</sup> Grade ASTM A36 or equivalent in sizes 3 inches and under.

<sup>9</sup> ITC Final Staff Report at Table Long-85.

the gap and reasonably satisfy demand in the market. The result would be extremely harmful to the competitiveness of U.S. customers of special profiles and would cause them either to lower their quality standards or pay prohibitive tariffs for fairly traded products not made in the United States.

**d. Names and Locations of Producers of the Product**

Aside from Corus, Arbed (EU), Hoesch Hohenlimburg, GmbH (EU), and Gerdau, MRM Steel (Canada) are the principal exporters of special profiles to the United States. To a much lesser degree, Fundia (EU) and Lasco (Canada) also export some of these specialty products to the United States. Corus believes that there are currently four domestic producers of special profiles in the United States. Steel of West Virginia is by far the largest; Pennsylvania Steel Technologies (a Bethlehem Steel subsidiary), Gaultier and McDonald Steel also participate in this market.

**e. Total U.S. Consumption**

The following chart shows Corus' best estimates of apparent U.S. consumption (in short tons) of the special profiles categories listed above:<sup>10</sup>

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<sup>10</sup> Special profiles pricing is a particularly difficult factor to predict with any precision or degree of reliability. As the quantity table shows, the market for special profiles is very steady by comparison to bulk/commodity steel products. Pricing for special profiles does not operate like that for commodity products, where prices are published but adjustments are made on the simple basis of mill loading. Pricing for commodity products can go up or down on a moment's notice, can change frequently and to any extent that producers feel market conditions justify. Special profiles are very much a close partnership between the producer and their end customers; therefore pricing is developed in a much more considered way. In general Corus believes that special profiles' pricing will tend to be steady over the coming years as the U.S. customers for these specialty products face continued pressure to lower their input costs and increase their manufacturing efficiency and productivity. Although special profiles are special and unique, their prices still face these supply chain pressures, so there likely will not be dramatic upswings in prices in the face of the expected upcoming economic downturn. Nonetheless, Corus expects that prices for special profiles will experience some increase in prices, as the prices for steel

(Continued ...)

Product	Volume, in thousands of short tons									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Grouser Bars	[100	132.9	142.2	87.9	101.9	126.5	126.5	132.9	138.1	140.9]
Rippershanks	[100	130	110	100	100	100	100	110	121	133]
Forklift Masts	[100	100.9	104.3	97.7	108.6	96.3	96.3	104	110.2	115.7]
Bulb Flats	[100	137.8	152	95.8	74.3	126.7	129	131.4	134.6	137]
Rims	[100	162.8	134.8	102.4	122.4	108	108	112.8	115.2	117.2]
Bevel Flats	[100	100	102	101.8	102.8	77.4	77.4	79.8	82	84.2]
Others	[100	119.2	106	99	99.6	84.9	86.5	91.6	94.3	96.2]
<b>Total</b>	<b>[100</b>	<b>118.6</b>	<b>115.8</b>	<b>97.3</b>	<b>103.4</b>	<b>97.4</b>	<b>98</b>	<b>103.3</b>	<b>107.3</b>	<b>110.2]</b>

There should not be any substantial increases in the volume of special profiles exported to the United States. The market for special profiles is expected to be flat over the next 12 to 18 months, with modest and steady growth expected from 2003 to 2005. Overall, given the global and highly specialized nature of this product and the very particular end uses, the special profiles market tends to be relatively steady. Growth generally comes from new product development, with a lesser degree of sensitivity to overall U.S. economic conditions than other hot-rolled bar and light shapes.

#### f. Total U.S. Production

The following chart shows Corus' best estimates of U.S. production of the special profiles categories listed above:

Product	In thousands of short tons									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Grouser Bars	[100	98.2	94.6	89.3	89.3	89.3	89.3	94.6	98.2	100]
Rippershanks	[100	100	100	100	100	100	100	100	100	100]
Forklift Masts	[100	104.8	107.1	107.1	116.2	104.8	104.8	113	120	126]
Bulb Flats	[100	100	100	100	100	100	100	100	100	100]
Rims	[100	109.6	107.4	102.6	102.4	95.7	95.7	100.4	102.6	104.3]
Bevel Flats	[100	109.1	105	100	100	77.3	77.3	81.4	84.5	86.8]
General	[100	108.1	105	99	97.2	86.6	88.3	93.5	96.3	98.3]
<b>Total</b>	<b>[100</b>	<b>107.3</b>	<b>105.5</b>	<b>101.4</b>	<b>102.8</b>	<b>91.2</b>	<b>92</b>	<b>97.8</b>	<b>101.6</b>	<b>104.6]</b>

overall increase. Corus simply cannot predict the magnitude of the increases with any degree of precision, however.

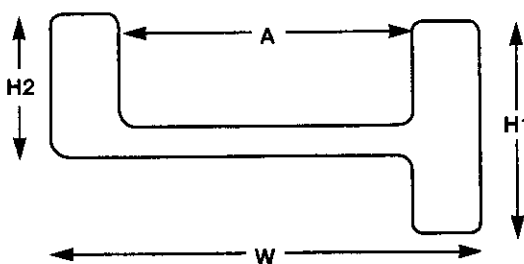
**g. U.S.-Produced Substitutes**

There are no substitutes for special profiles. In fact, these products are used for very specific, highly specialized end-uses such that substitutions cannot be made among product categories, or even among grades or sizes in the same categories.

## **Exhibit 1**

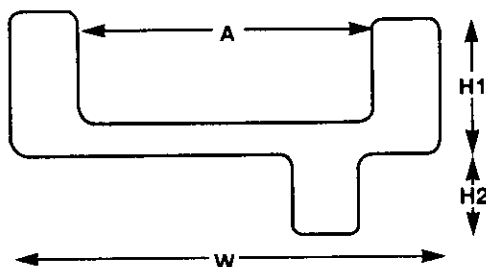
# Open Roll Mast Profiles

J profiles



Profile	Dimensions (mm)				KG/M
	W	H1	H2	A	
W94.016	92	68	40	62	19.0
W84.002	93	71	41	62	21.5
SK1122	122	72	41	81	23.2
SK1131	131	67	48	88	25.2
W67.010	162	81	48	89	46.4
W88.072	166	90	51	116	39.8
W88.074	185	99	56	131	47.4

Offset J profiles



Profile	Dimensions (mm)				KG /M
	W	H1	H2	A	
W70.043	116	46	34	75	26.6
W69.024	121	41	27	89	22.5
W70.045	136	49	38	88	33.0



# Open Roll Mast Profiles

## Steel Specifications and Mechanical Properties



A range of carbon-manganese, and High Strength Low Alloy (HSLA) carbon-manganese-microalloyed steels are available for use in both mast profile and carriage bar applications. Some of the more frequently supplied specifications are EN 10025 S355J0, EN 10025 S355J0 modified (with higher minimum yield stress), St52-3 Nb, SAEV 1027 modified and J13 G4051 C45 modified. All of these steels are fine grained, treated with vanadium and/or aluminium. They offer a range of mechanical properties, with minimum yield stress values from 345N/mm<sup>2</sup> up to 480N/mm<sup>2</sup>.

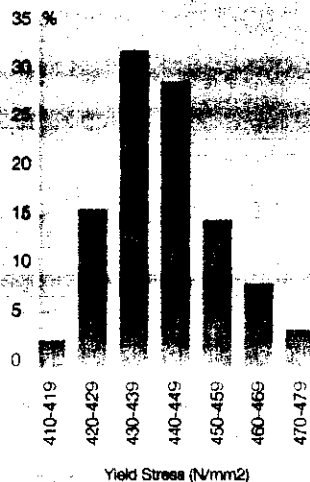
While chemical composition and mechanical properties are important for mast profile applications, other features such as segregation within the steel, and microcleanliness of the steel are also significant. The level of segregation and cleanliness is a function of the steelmaking process.

For all mast profiles supplied by Corus, the steel is manufactured by the continuous casting process, from ISO 9000 approved suppliers. The continuous casting process provides optimum steel quality, including shrouding of the casting stream, to prevent re-oxidation, and the formation of detrimental macro inclusions.

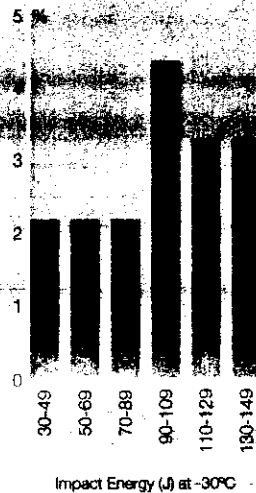
The use of lower carbon, microalloy steels offers improved resistance to brittle fracture. In many situations, this allows welding of mast profiles without the use of preheat (depending on material thickness and joint design). Corus' engineers can offer assistance in the selection of the most appropriate steel specification and fabrication technique.

### S355J0 Modified: Mechanical Properties

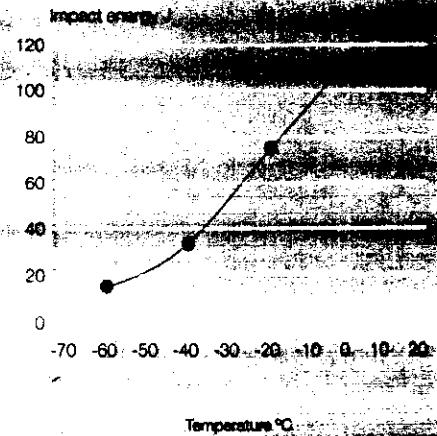
Yield Stress



Charpy V Notch

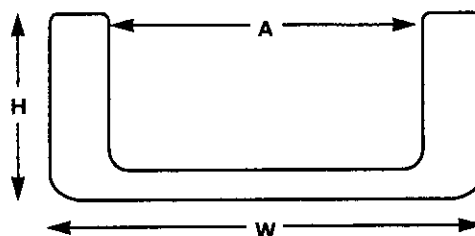


Charpy V impact

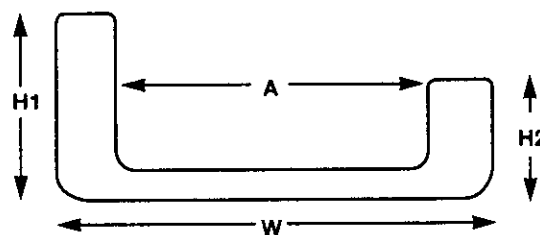


# Open Roll Mast Profiles

Channels



Profile	Dimensions (mm)			KG /M
	W	H	A	
W75.067	88	38	63	12.9
W71.096	115	45	76	19.8
W91.024	138	46	106	21.5
W71.050	156	51	102	30.5
W81.037	229	76	165	53.9



Profile	Dimensions (mm)				KG /M
	W	H1	H2	A	
W68.149	128	54	43	89	24.5
W82.028	134	60	53	95	26.0
W75.141	145	54	48	102	27.1
SK 1519	153	69	46	102	35.6
SK 1520	158	68	43	102	29.3
W75.126	163	61	48	115	29.5
W60.029	185	67	54	128	39.8
W70.036	226	73	54	153	50.6

# Open Roll Mast Profiles

## Steel Specifications and Mechanical Properties



A range of carbon-manganese, and High Strength Low Alloy (HSLA) carbon-manganese-microalloyed steels are available for use in both mast profile and carriage bar applications. Some of the more frequently supplied specifications are EN 10025 S355J0, EN 10025 S355J0 modified (with higher minimum yield stress), St52-3 Nb, SAEV 1027 modified and J13 G4051 C45 modified. All of these steels are fine grained, treated with vanadium and/or aluminium. They offer a range of mechanical properties, with minimum yield stress values from 345N/mm<sup>2</sup> up to 480N/mm<sup>2</sup>.

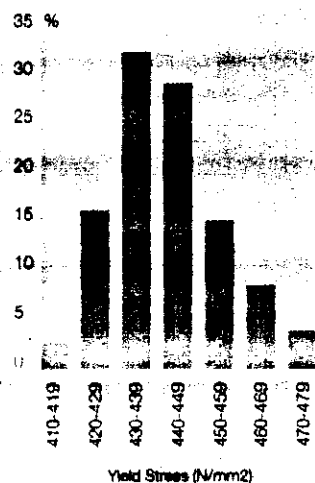
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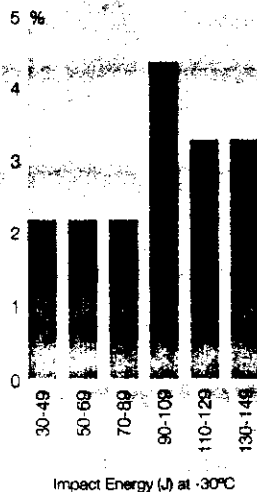
The use of lower carbon, microalloy steels offers improved resistance to brittle fracture. In many situations, this allows welding of mast profiles without the use of preheat (depending on material thickness and joint design). Corus' engineers can offer assistance to customers with the selection of the most appropriate steel specification and fabrication technique.

### S355J0 Modified: Mechanical Properties

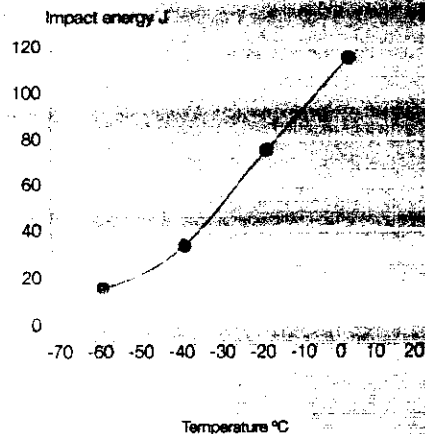
Yield Stress



Charpy V Notch

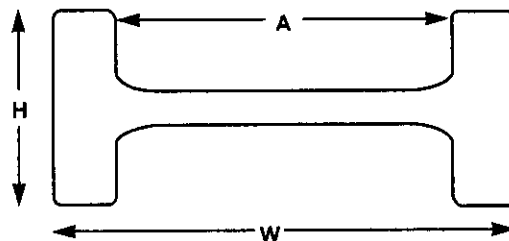


Charpy V impact



# Open Roll Mast Profiles

Beams



Profile	Dimensions (mm)			KG /M
	W	H	A	
W64.113	100	54	72	17.6
W71.049	114	64	83	22.1
W68.141	121	66	89	24.8
W78.011	127	64	92	22.5
W76.083	131	71	90	33.2
W60.028	140	70	102	30.7
W80.085	149	67	115	26.7
W60.030 / SK 8136	175	76	128	42.3
W76.049	180	85	130	46.9
W70.035	216	89	153	58.8
W81.023	229	95	165	67.7

# Open Roll Mast Profiles

## Steel Specifications and Mechanical Properties



A range of carbon-manganese, and High Strength Low Alloy (HSLA) carbon-manganese-microalloyed steels are available for use in both mast profile and carriage bar applications. Some of the more frequently supplied specifications are EN 10025 S355J0, EN 10025 S355J0 modified (with higher minimum yield stress), St52-3 Nb, SAEV 1027 modified and J13 G4051 C45 modified. All of these steels are fine grained, treated with vanadium and/or aluminium. They offer a range of mechanical properties, with minimum yield stress values from 345N/mm<sup>2</sup> up to 480N/mm<sup>2</sup>.

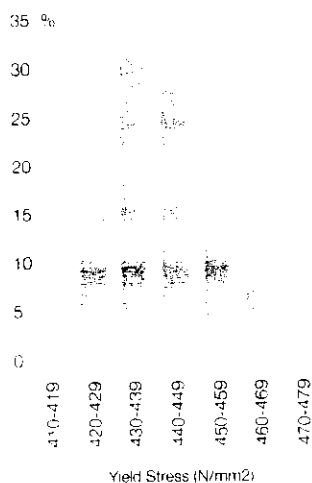
While chemical composition and mechanical properties are important for mast profile applications, other features such as segregation within the steel, and microcleanliness of the steel are also significant. The level of segregation and cleanliness is a function of the steelmaking process.

For all mast profiles supplied by Corus, the steel is manufactured by the continuous casting process, from ISO 9000 approved suppliers. The continuous casting process provides optimum steel quality, including shrouding of the casting stream, to prevent re-oxidation, and the formation of detrimental macro inclusions.

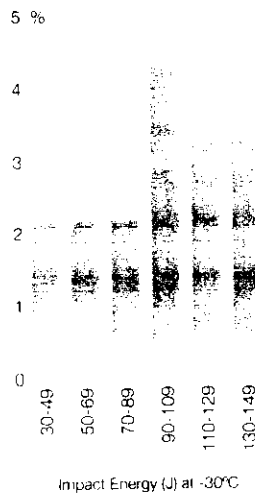
The use of lower carbon, microalloy steels offers improved resistance to brittle fracture. In many situations, this allows welding of mast profiles without the use of preheat (depending on material thickness and joint design). Corus' engineers can offer assistance to customers with the selection of the most appropriate steel specification and fabrication technique.

## S355J0 Modified: Mechanical Properties

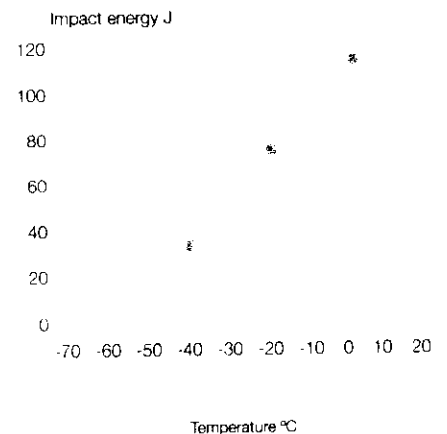
Yield Stress



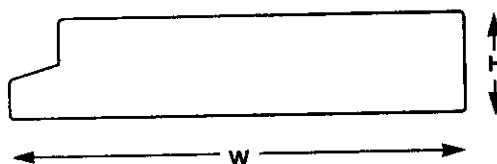
Charpy V Notch



Charpy V impact



# Open Roll Carriage (Hanger) Bar Profiles



Profile	Dimensions (mm)		KG /M
	W	H	
SK2818	110	30	24.2
W74.005	127	26	24.4
W71.037	150	30	33.9
W71.038	150	35	39.1
W71.039	150	38	42.2
W90.018	150	40	44.4
W71.040 / SK2518	152	32	36.3
W71.041	152	35	39.6
W90.019	178	51	67.1
W90.020	178	57	74.8
W71.051	180	38	51.3
W71.042	180	45	60.2
W71.043	180	57	75.5

# Open Roll Carriage (Hanger) Bar Profiles

## Steel Specifications and Mechanical Properties



A range of carbon-manganese, and High Strength Low Alloy (HSLA) carbon-manganese-microalloyed steels are available for use in both mast profile and carriage bar applications. Some of the more frequently supplied specifications are EN 10025 S355J0, EN 10025 S355J0 modified (with higher minimum yield stress), St52-3 Nb, SAEV 1027 modified and J13 G4051 C45 modified. All of these steels are fine grained, treated with vanadium and/or aluminium. They offer a range of mechanical properties, with minimum yield stress values from 345N/mm<sup>2</sup> up to 480N/mm<sup>2</sup>.

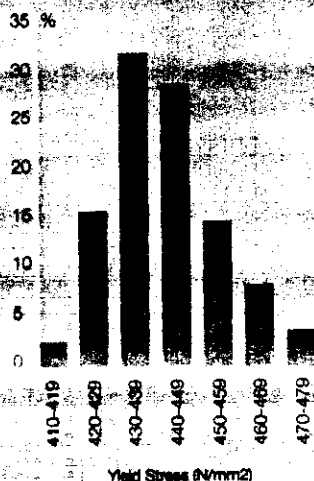
While chemical composition and mechanical properties are important for mast profile applications, other features such as segregation within the steel, and microcleanliness of the steel are also significant. The level of segmentation and cleanliness is a function of the steelmaking process.

For all mast profiles supplied by Corus, the steel is manufactured by the continuous casting process, from ISO 9000 approved suppliers. The continuous casting process provides optimum steel quality, including shrouding of the casting stream, to prevent oxidation and formation of detrimental macro inclusions.

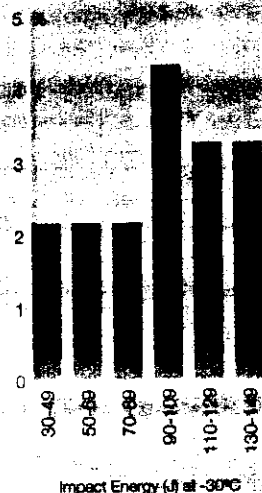
The use of lower carbon, microalloy steels offers advantages in terms of brittle fracture. In many situations, this allows welding of the joints without the use of preheat (depending on material thickness and joint design). Corus' engineers can offer assistance to customers with selection of the most appropriate steel specification and fabrication technique.

### S355J0 Modified: Mechanical Properties

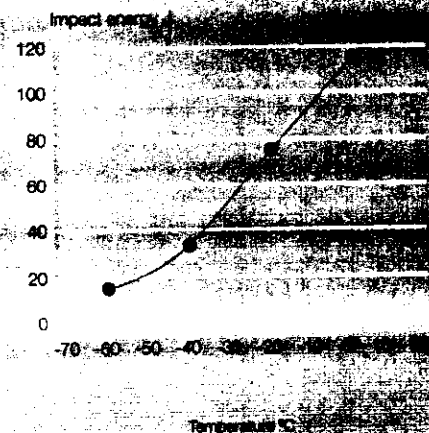
Yield Stress



Charpy V Notch



Charpy V impact



## **Exhibit 2**



**THIS EXHIBIT IS NOT SUCEPTIBLE TO  
SUMMARIZATION**